

then the attitude of a female insect ovipositing. As has been mentioned, if the hole is large enough the abdomen will be fully inserted, and it is perhaps possible that copulation may take place while the female is yet in the burrow. On emergence she is instantly seized, the legs of the male clasping the yet unfolded wings with the abdomen, and thus preventing her from flying. From the large number of males always about at this season, it is probable that the female seldom, if ever, emerges unattended. After the very brief honeymoon, she is no longer an attraction to the opposite sex, and is able to proceed unmolested with her work of depositing the germs of a future generation. I may add that of the pair confined by me the male died the same or following day, while the female was strong and vigorous until she unadvisedly entered a cyanide bottle.

STRAY NOTES ON MYRMELEONIDÆ, PART 3.

BY DR. H. A. HAGEN, CAMBRIDGE, MASS.

(Continued from page 156.)

The following species are very interesting, as they possess no spurs at the end of the tibiæ. From N. America are four species, two not yet described. All agree in the following characters: They are very slender, more or less hairy or villous; head small, narrow; antennæ long, as long as head and thorax, or at least prothorax, stout, cylindrical, becoming gradually thicker but not clavate; labial palpi a little longer than the maxillary ones; last joint very little thickened to the middle, where a superior depression makes the apical half about cylindrical; legs short, not very thick, with numerous spines and bristles, but no spurs; first joint of tarsi longer than the following, but shorter than the apical one; abdomen of male considerably longer, of female shorter than the wings; appendages of male short approximate, cylindrical with strong hairs and spines, enlarged at the base to reach the dorsum of abdomen; between them below a very small triangular plate; female with two short flat appendages inferiorly; upper part rounded, split in the middle; wings elongate, narrow, enlarged to the bluntly pointed tip; post-costa oblique; venation dense, and sprinkled more or less with brown; costal space of front wings with two series of areoles (one species) or with one series, but the transversals in the apical half (or less) forked; at the extreme

base of the hind wings of the male is a small white free knob, homologous to the larger and darker knob of *Palpares* and *Acanthaclisis*. The larva of one species is known; it differs from all others and was described by me as perhaps belonging to *Acanthaclisis congener*.

Mr. McLachlan has described the female of a species from Turkestan as a new genus, *Maracanda amoena*, which has the same characters as the N. American species, with one series of areoles in the costal space of the front wings. The only exception is that the apical joint of the labial palpi are said to be very much dilated, what is not to be found in the N. American species. I do not know *M. amoena*, but I should think that its difference from *M. imbecillus* Stein., from Greece, should be proved. *M. conspurcatus* Kolenati, from the same locality with *M. amoena*, can not belong to *Creagris plumbeus*, where it is quoted by Brauer and McLachlan, as its size is by far too small and only very little larger than *amoena*. I can not compare the two Australian species, said to have no spurs.

I possess a couple of *M. imbecillus* Stein (Berl. Ent. Zeit., vii., p. 421) from Montenegro, Europe, which agrees entirely with *M. amoena*, and can not be identified with any other described species. The legs have no spurs,* contrary to Stein's description, but bristles, yellowish-brown, straight, half shorter than the basal joint. After this rather long preamble, I come to the question if perhaps some Myrmeleon, just as among Phryganids some Limnophilids have spurs which can be wanting or aborted, at least on the fore legs.

There are a number of N. American Myrmeleon, *M. longicaudus*, *M. ferus*, *M. nebulosus* and others, which nobody would separate from *M. conspersus*, except by the presence of spurs. Some have two series of areoles in the costal space, and some only one series, as in *Maracanda*. Nevertheless none of the seventeen *M. conspersa* before me has a spur, and none of the six *M. longicaudus* and the six *M. contaminatus* lacks spurs. Therefore I have the species without spurs described as belonging to *Maracanda*, and propose provisionally for the other a new genus, *Brachynemurus*.

Maracanda, McLachlan.

This new genus is described in A. Fedtschenko's Voyage in Turkestan, vol. ii., 5, Moscow, 1875. The largest part is in the Russian language. As the N. American species without spurs at the tips of the tibiae must

* Mr. H. J. Kolbe, Assistant of the Berlin Museum, has kindly compared Stein's type and confirms my statement.

be compared with this genus, and as only one Entomologist in the U. S. reads Russian, I give here a translation (by Prof. J. D. Whitney, in Cambridge, Mass.).

Maracanda, nov. gen.

Tibiae hand calcaratae. Antennae breves, robustae, clava elongata. Palpi breves, labiales articulo ultimo valde dilatato. Pedes breviusculi, tarsorum articulo primo multo longiori quam secundus, sed breviori quam ultimus. Abdomen alis brevis. Alae elongatae, angustatae, post-costa obliqua; alae posticae anticis paulo breviores; femina.

This genus, by the want of the spurs on the tibiae, is related to *Gymnocnemia*. The short, thick antennae, the construction of the palpi, however, make it impossible to put the species described below in the same genus with *G. variegata*, the typical species of the genus *Gymnocnemia*.

Remark—*Myrmeleon occultus* Walk. and *M. malus* Walk., from Australia, also do not have spurs on the tibiae (in the description of these species, however, this peculiarity is not mentioned). It is very probable that both these species ought to be included in the genus *Maracanda*.

1. *Maracanda amoena*, McLachl., n. sp., p. 2, pl. i., fig. 1.

Pallide flava. Antennae brunneae, vix pallido-cinctae. Caput thoraxque lineis tribus longitudinalibus fusco-nigris supra signata. Abdomen nigrum vel fuscum, utrinque et infra flavo-lineatum. Pedes flavi, femoribus extra nigris, tibiis in medio et ad apicem nigris, articulisque tarsorum ad apices nigris. Alae albido-hyalinae, punctis plurimis (praecipue apicem versus) nigris conspersae, venis venulisque albidis, nigrostriatis, pterostigmate nigro-signato, femina.

Long. corp. circ. 15 m.m.; exp. alar. 34 to 40 m.m.

Habitat in deserto Kisil-kum; five specimens were collected May 12, 1871, in the region of sand-hills about 10 versts west of Djusebai Springs.

Antennae longer than the head and the front part of the thorax, gradually passing into a thick elongated clavate form, cinnamon colored with the exception of the basal joint; the cinnamon color of the remainder of the joints passes with a whitish color on the articulations; the body is bright yellow. The head has above three small elongated dusty lines, which unite with each other in front; on the side from the end of these dark spots there extends a single dusty transversal line; a single knotted line of the same color is seen on each of the antennae; finally a single elongated dusky line extends along the front of the head. The labrum is

not long, but rounded on the front margin ; the labial palpi are somewhat longer than the maxillary, with the terminal joint much broadened, pointed, outside with a dark, large shining spot. The prothorax has parallel margins, and above three long, black or dusty lines, equally distant from each other. On the meso- and metathorax these lines are separated with distinct spots, among which appear a few small black lines and spots ; upon the side of the thorax two dark lines are seen on each side. Legs short and not very thick, bright yellow, covered with shining hairs ; on the outer side of each femur a dusty or reddish line ; each tibia is surrounded in the middle with a dark ring, frequently wanting in the posterior tibiæ. The abdomen is almost entirely black or dusty, with broad yellow rings on the sides and lower surface ; at the extremity of the abdomen are found two broad triangular plates, rounded off towards the end, approximate, surrounded internally with black bristles and covered externally with black hairs ; under these plates are placed two auxiliary palpi, one under each plate, the lower half of the following abdominal segment deeply cleft in the middle, and with a lengthened fringe joins a long cylindrical growth. The wings are long and narrow, the posteriors somewhat narrower and shorter than the anterior pair, whitish transparent, sprinkled with a great number of delicate black spots, particularly thickly grouped along the radius and the inner margin of the wings, and form an almost unbroken line along the outer series of gradate veinlets. The venation is very open (few transversal veins) ; the veins are pale whitish or whitish yellow, over the greatest part on the minute black spots ; the posterior wings have dark lines and spots in a small number ; pterostigma whitish and black internally. (McLachlan.)

Of course I am unable to decide if the Russian translation of the English original is exact ; at least only in one place (genitals of female) I find some difficulty in understanding it.

2. *Maracanda conspersa*, Rbr.

M. conspersus, Rbr., 327, 3—Walk., 329, 47.

Body hairy, black, with whitish spots, very slender ; head small, face pale, above with a broad transversal blackish band, in which the antennæ are inserted ; this band is excised below in middle ; before the labrum on each side a brownish spot ; vertex cut straight in front, very little notched in middle, black, with a faint yellow lateral dot ; before the vertex a transversal pale band ; antennæ long, 7 m.m., strong, cylindrical, a little thicker

to the tip, which is bluntly pointed but not clavate; black, very faintly annulated with pale on a few basal segments; maxillary palpi short, brown, or blackish brown, base of cylindrical joints pale, last joint very little incurved, cut at tip, as long as 3rd and 4th together, 3rd a little longer than 4th, thicker on tip.

Labial palpi a little longer, basal joint pale; second longer, enlarged to tip, a little incurved; last joint longer, thicker to middle, above depressed, cylindrical, tip blunt; both joints blackish, pale on articulation.

Prothorax short, before the middle a transversal flat furrow, front margin slightly rounded; black with three yellow dots anteriorly and a posterior stripe on each side; with some white hairs, intermixed with black ones; mesothorax dull brownish gray, with a few scattered white hairs, two yellow dots anteriorly and four in a transversal series in the middle; the conical suture ending in the posterior margin pale yellow with a middle dagger-shaped black line, and on each side a shorter black line; in front of it two globular black shining elevations, which are approximate and like two ocelli; metathorax similar with some yellow spots.

Abdomen (male) longer than the wings, very slender, about cylindrical, blackish hirsute; brown, shining, darker below and at the apex; segments 2 to 4 with two pale dorsal longitudinal lines, which are sometimes partly confluent; the two following segments with two pale spots in middle; appendages brown, clothed densely with black hairs, straight, the base triangularly dilated to reach the dorsum of the segment; shorter than the last segment. Abdomen (female) much shorter than the wings, less slender, apical half thicker; color similar, but the long pale dorsal lines represented only by two middle and two apical spots; genital parts in the last segment with many strong black spines; upper part divided in two pale tubercles; below with two short brown appendages.

Legs short, pale, with white hairs, intermixed with a few black ones, principally at tip, densely sprinkled with black, the femurs sometimes nearly blackish; tip of tibia black; tarsi with apex of the two basal joints, the two following entirely, and tip of fifth, black; claws long, incurved, brown; spurs wanting.

Wings short, broadest before the bluntly-pointed apex; hyaline with white shades, a little fumose, the anteriors closely sprinkled with fuscous; venation dense, veins fuscous interrupted with white; around the transversals after the mediana and after the 4th vein, brown shades, sometimes forming brown streaks on the disk and near the hind margin; two series

of areoles in the costal space except near the base; hind wings less spotted.

Length of body, male, 32 to 44 m.m.; female, 21 to 27 m.m. Exp. al. 42 to 60 m.m.

Habitat.—I have before me 8 males and 9 females. From Canada; Upper Wisconsin River, Kennicott; from Hamilton, Ontario, Moffat; Michigan, a couple in alcohol, Capt. Meade; Ludington, Mich., Pierce; Port Huron, Mich., Hubbard; from New Jersey, Uhler; from S. Carolina, Zimmerman, the type of *M. Talpinus* Klug.; from Savannah, Ga., the type of *M. irroratus* Burm., vol. ii., p. 995, No. 11, with the label in Burmeister's hand-writing; from Millin, Scriven Co., Ga., July, by Morrison; from Florida, Norton.

The range of the species is very large; the largest specimens are from Canada and Michigan, the smallest from Georgia. The wings are more or less sprinkled.

The species has been raised from a larva which I had supposed to belong to *Acanthaclisis congener*, but Mr. Redtenbacher rightly doubted my determination. I have besides the described larva from Wyoming before me, one from Port Huron, Mich., and one from Crescent City, Fla., both collected by Mr. Hubbard. I can not find any difference between them and a larva from Ludington, Mich., by Mr. Pierce, who intends to describe the full history of the species raised by himself.

When I was still in Europe, I had determined "with some doubt" this species as the *M. abdominalis* Say. The large material now at hand has shown me years ago that Say's species is a different one. As there exist before Burmeister two different *M. irroratus*, Rambur's name has the priority; his type is a female. The *M. irroratum* Oliv., Encycl., viii., p. 126, No. 30 (copied by Walk., p. 408, No. 207), from Italy and Greek Archipel., is probably *M. imbecillus* Stein. The *M. irroratus* Klug., Symb., pl. 35, f. 6, from Arabia Felix, has visible spurs. The type is in the Berlin Mus.; I can not determine the species, but believe it is not a *Creagris*. After Mr. Taschenberg, there can be no doubt that the type of Burmeister of his *M. irroratus* in the Halle Museum, is different from his type in Winthem's Coll. The type in the Halle Museum is *M. longicaudus* Burmeister, after his type in Winthem's Coll. *M. contaminatus* Burm. is the female of *irroratus* type (in Winthem's Coll.); Mr. Taschenberg's description is conclusive. *M. nebulosum* Oliv., Enc. Meth., viii., 127, 35, from New York, is *M. conspersus* Rbr.; the description of

the color of abdomen excludes the other related species. *Myrm. contaminatus* was mentioned in a note to *M. irroratus* Burm., ii, 995, 11. The probable type was described in Giebel Zeits., vol. 52, 214, 30.

3. *Macaranda signata* Hag.

Body hairy, yellow, striped with brown; not very slender. Head small, face yellow, eyes margined with bright yellow, which is followed inside by a black line in the groove and another median one; antennæ brown with a bright yellow ring, followed on the face by a brown triangular spot; vertex elevated; its front margin notched in middle and on each side; above dark brown, sides and occiput largely yellow, also two transverse interrupted bands; a pale transversal band before the vertex, separated from the antennæ by a narrow brown one; maxillary and labial palpi as in *M. conspersus*, yellow, apical joint light brown; prothorax yellow, above with a broad brown band with a fine yellow median line and a yellow stripe on each side; sides whitish-villous; thorax yellowish with brown stripes, the pattern similar to *M. conspersa*. Abdomen of male about as long as the wings, less slender, whitish-villous, yellow, very finely sprinkled with blackish dots; sides and apex blackish-brown; a fine black median line on 3rd and 4th segments; appendages as in *M. conspersa*; abdomen of female much shorter than the wings, black, the apical half with some ill-defined yellow marks on the sides and tip of segments; legs in shape and color as in *M. conspersa*, but joints 3 and 4 black only on tip. The genitals are light brown, similar to *conspersa*.

Wings hyaline, not sprinkled; veins brown, interrupted with yellow; pterostigma yellow, faintly darker inside; venation as in *conspersa*, with the important exception that the costal space of front wings has only one series of areoles; the transversals in the apical half of the wing are forked.

Length of body, male, 27 m.m.; female, 21 m.m. Exp. al., 46 m.m.

Hab.—A female, fully developed, from White Fish Point, Lake Superior, by Mr. Hubbard, but the yellow color of the body is more slate color. Ludington, Mich., Mr. Pierce. The couple before me, in bad condition, were sent in 1881; later, when Mr. Pierce worked here, these specimens were mislaid and only turned up now. I am certain that this species was not among the specimens brought over with him. The male apparently has been transformed only a short time ago, therefore it can be presumed that its abdomen has not attained its full length.

4. *Maracanda Henshawii* Hag.

Body very slender, hairy, striped with yellow. Head very small; face yellow, black near antennæ; two small black dots on each side and one in middle; antennæ longer than head and prothorax, stout, cylindrical, tip narrowed; black, the basal joint and the articulations yellow; maxillary palpi pale with a brownish tinge, apical joint brownish; labial palpi white, apical joint after basal third dark brown; vertex elevated, black anteriorly, with a thin silvery felt; above yellow with two transversal black lines and some spots near occiput; prothorax black, a fine yellow median line and a yellow dot each side of the line near the front margin; sides largely yellow, with a blackish stripe; mesothorax black, anteriorly with two narrow lines, followed by a median one and two faint lines on each side, all yellow; metathorax black with a yellow cross of spots and lines; sides of thorax black, with two yellow lines; abdomen very slender, black, segments 2 to 6 with a dorsal yellow band, split by a faint black median line; appendages short, straight, cylindrical, brown, with a brush of black hairs; base going upward to dorsum; below between them a small black triangular plate, with yellow tip; legs short, thin, pale, femur externally black; tibiæ with white hairs, and some black bristles around tip; four anterior tibiæ sprinkled with black externally; tip of all, and tip of joints of tarsi black, more on last joint; no spurs; claws incurved, reddish-brown. Wings hyaline, narrow; costal space with one series of areoles and the transversals in the apical fourth of wing forked; veins brown interrupted with yellow; pterostigma small, yellow, with a blackish spot internally; wings very little sprinkled; along the anterior longitudinal veins the transversals shaded with brown; front wings with an oblique dark stripe parallel to the hind margin of the apex; hind wings less sprinkled along the anterior longitudinal veins.

Length of body 30 m.m.; exp. al., 40 m.m.

Habit.—Umatilla, Oregon; one male, June 24, 1882, collected by Mr. S. Henshaw.

This species is directly separated from the two foregoing by its small size, and by anterior face of the vertex being black.

5. *Maracanda? pygmaea* Hag.

Myrmelcon pygmaeus Hag., Syn. N. Am. Neur., p. 231, No. 13.

The type collected in Mexico by Mr. Deppe is in the Berlin Museum. Not knowing anything more about this smallest described species than

what is given in the Synopsis, I have not re-copied my description. The species arrived just in the last moment, when my manuscript was to be sent to Washington, therefore I have not given more details. The characters quoted—antennæ short, club large, almost orbicular; wings short the apex very much dilated; the venation peculiar, simple—make it doubtful if *M. ? pygmaea* belongs to this genus.

FURTHER INJURY TO LIVING PLANTS BY WHITE ANTS.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

More than twenty-five years since (Proc. Boston Soc. Nat. Hist., v. 7, p. 287-288) I published an account of serious injury to living grape-vines in hot-houses in Salem, Mass., by our common species of white ants. *Termes flavipes*. No further notice of their injury to living vegetation appears to have been taken until a few years ago, when Prof. J. H. Comstock, then government entomologist, stated (Rep. Comm. Agric., 1879, 207-8) that they had been found in Texas and Florida "girdling the bark of orange trees and guava bushes near the surface of the ground, or eating out the interior of sugar-cane and other plants." "When white ants infest living plants," the report goes on to state, "they attack that part which is at or just below the surface of the ground. In the case of pampas grass, the base of the stalk is hollowed; with woody plants, as orange trees and guava bushes, the bark of the base of the trunk is eaten, and frequently the tree is completely girdled; with sugar-cane the most serious injury is the destruction of the seed cane."

Still more recently, Dr. H. A. Hagen published in the CANADIAN ENTOMOLOGIST (v. 17, p. 134-136) another instance here in Cambridge where living maple trees were largely infested by them, though the ants appeared to have done little damage, the trees being "apparently in good condition," but one of them being felled it was found that for a couple of feet above the ground, to the depth of an inch from the surface, the trunk was extensively burrowed by the white ants.

In this same article, after referring to the injury reported from Salem, Dr. Hagen adds: "The earth in the hot-houses here in Cambridge is largely infested by white ants, but as far as I know, no destruction of